THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 21. MAY 24, 1952 VOL. 64.

THE SUPPRESSION OF OESTRUS IN DAIRY CATTLE AFTER MATING

BY

D. L. STEWART, M.R.C.V.S.,

MINISTRY OF AGRICULTURE AND FISHERIES READING CATTLE BREEDING CENTRE, READING

The recent more numerous reports of infertility in Great Britain may not be due so much to a change in the level of fertility as to the current economic conditions which demand a much higher degree of efficiency in the management of dairy herds than was necessary previously. Infertility is nevertheless considered by many to be the most serious condition limiting the production of dairy cattle.

Attention was focused on the problem of infertility by various investigations into the cause of disposal of dairy cows: these were reviewed by MacGregor (1941), who showed that 6 per cent. of the cows in the dairy herds in Great Britain were disposed of annually as a result of sterility, *i.e.*, 23 per cent. of the total disposals. Ideally a cow should calve once every 12 months and, since many cows that are retained in herds do not breed with regularity, the incidence of infertility must be very much higher than the foregoing figures indicate. The term infertility as applied to dairy cattle can be defined as any condition that results in an unintentional increase in the calving interval. The external symptoms exhibited by dairy cows are regular returning to oestrus after service, persistent oestrus (nymphomania) or the failure to exhibit signs of oestrus.

It has been observed by many workers that large numbers of dairy cows do not return to oestrus at the normal time after an unsuccessful mating, *i.e.*, approximately 21 days later, but after a longer and irregular interval. Attention was drawn to this by Stewart (1950) and his observations are shown in Table I, Artificial Insemination Group. Similar results have been published without comment in the U.S.A. by Casida, Barrett and Lloyd (1946) and by Barrett, Casida and Lloyd (1948), and in Great Britain by the Milk Marketing Board (1950) and Holt (1952). This delay in returning to oestrus after an unsuccessful service can be referred to as the suppression of oestrus, the term used by Laing (1950), which can also be used to include all conditions associated with the absence of oestrus in adult cattle.

When these delayed returns to oestrus were first observed in clinical work it was suggested that either early abortions were occurring as in trichomoniasis, or that stockmen were failing to observe oestrus. The former as a general explanation is precluded by improved methods of diagnosis revealing that trichomonad infection is much less widely distributed than at first had been supposed, whilst the latter is less likely when it is realised that the condition occurs in well-managed herds where competent herdsmen are employed, who, in any case, had been quite capable of observing the previous oestrus.

As a result of the observations made in the Artificial Insemination Group, Table I, and the foregoing considerations, it was decided to investigate this matter further and a study of the available records of suitable herds was made together with a series of clinical observations. In the former group only natural mating was used and it will be referred to as the Natural Mating Group; the herds chosen for clinical study will be designated the Clinical Observation Group.

HERD RECORDS

The modal length of the oestrous cycle in the cow is 21 days and 84 per cent. of cycles fall between 18 and 24 days (Asdell, 1946), and so almost all normal cows that fail to conceive should return to oestrus within a period of 28 days after mating. This can, therefore, be made the basic period in this investigation. At the Reading Cattle Breeding Centre it has always been the practice to estimate the conception rate as the percentage of cows which have not been reported as returning to oestrus after the first insemination within a period of 28, 56 and 112 days. The data employed in this investigation have been extracted from the herd breeding records in the same manner as the conception rates are compiled in the routine artificial insemination service. The data were obtained as follows:—

(1) *Natural Mating Group.*—Data for a period of years were obtained from the breeding records of herds kept by three different owners. The selection of the owners was governed by the accuracy of the record keeping systems they employed and the period depended on the length of time the particular system had been in operation. These herds were well above the average in standard of management and freedom from infectious disease.

(2) *Clinical Observation Group.*—Twenty-two dairy herds were selected for clinical study, some using natural mating, some insemination and others both methods of mating. These herds were also above average in standard of management and were believed to have a previous history of normal fertility. Observations on 426 cows served for the first time after calving were made during the period November, 1949, to March, 1950. A study of the records was made as in the Natural Mating Group except that the data were not related to calvings but to the percentage of cows diagnosed pregnant as a result of the first service.

RESULTS

Table I summarises the results obtained from the investigation of herd records and from the earlier artificial insemination studies. In the Natural Mating Group the differences between the calving percentage and the estimated 28-day conception rate was 22 per cent., the differences for the individual Herds I (a), I (b), II and III being 16·5, 27·0, 25·6 and 21·4 per cent. respectively. In the Clinical Observation Group the level of fertility was lower but the differences were similar to those in the Natural Mating Group, *viz.*, 27·1 per cent. for natural mating and 24·4 per cent. for artificial insemination.

The 1946 period of artificial insemination (Table I) shows the greatest drop in conception rate but this may be due

to the fact that the outcome of 11·1 per cent. of the first inseminations was unknown and could not be included in the calculation of the probable conception rate. Therefore for comparison purposes it might be more suitable to consider the differences shown by the main groups between the calculated conception rates based on non-returns after 28 days and after 112 days. If this is done the differences are 16·8, 16·7, 19·0 and 24·4 per cent. respectively. Similarly the differences between the estimates after 28 and 56 days are 9·6, 10·0, 10·8 and 15·5 per cent. and between the 56- and 112-day estimates 7·2, 6·7, 7·2 and 8·9 per cent. The results on Herds I (a) and I (b) were interesting in that the differences between the 28-day estimates and the calving percentages were 16·5 and 27·0 respectively, which might be related to the considerable difference in conception rate. In passing it may also be noted that during the period 1922-33 this herd was completely free from brucellosis and that during 1933-42 the herd was infected with brucellosis and many abortions occurred despite continuous attempts to control the infection.

Twenty of the 22 herds included in the Clinical Observation Group show evidence of the suppression of oestrus to a greater or lesser extent after mating.

The results from the Natural Mating and Clinical Observation Groups are of interest in that the difference between the 112-day estimate and the pregnancy or calving per-

TABLE I
HERD RECORDS

Group	Sub-group	Period	Number of first services	Percentage of cows not reported as returning within :			Percentage pregnant	Difference in conception rate from :			
				28 days	56 days	112 days		28–56 days	56–112 days	28–112 days	28 days to pregnancy
Artificial insemination	—	1.10.44–30. 9.45	2,046	82·9	73·3	66·1	57·5*	– 9·6	– 7·2	–16·8	–25·4
	—	1. 1.46–31.12.46	3,828	81·0	71·0	64·3	52·2	–10·0	– 6·7	–16·7	–28·8
Natural mating	Herd I (a) ...	1.10.22–30. 9.33	400	86·0	76·3	71·0	69·5	– 9·7	– 5·3	–15·0	–16·5
	„ I (b) ...	1.10.33–30. 9.42	366	81·4	69·7	58·5	54·4	–11·7	–11·2	–22·9	–27·0
	„ II ...	1. 1.45–30.12.49	630	88·6	74·9	66·2	63·0	–13·7	– 8·7	–22·4	–25·6
	„ III ...	1. 1.44–30.12.49	868	87·2	78·3	70·6	65·8	– 8·9	– 7·7	–16·6	–21·4
	Group total ...	—	2,264	86·4	75·6	67·4	63·9	–10·8	– 7·2	–19·0	–22·5
Clinical observation	Natural mating	28.10.49–23. 3.50	266	80·1	63·5	54·5	53·0*	–16·6	– 9·0	–25·6	–27·1
	Artificial insemination...	28.10.49–23. 3.50	160	75·0	61·3	52·5	50·6*	–13·7	– 8·8	–22·5	–24·4
	Group total ...	—	426	78·2	62·7	53·8	52·1*	–15·5	– 8·9	–24·4	–26·1

* Pregnancy results obtained by clinical diagnosis in contrast to the other groups in which calving data were available.

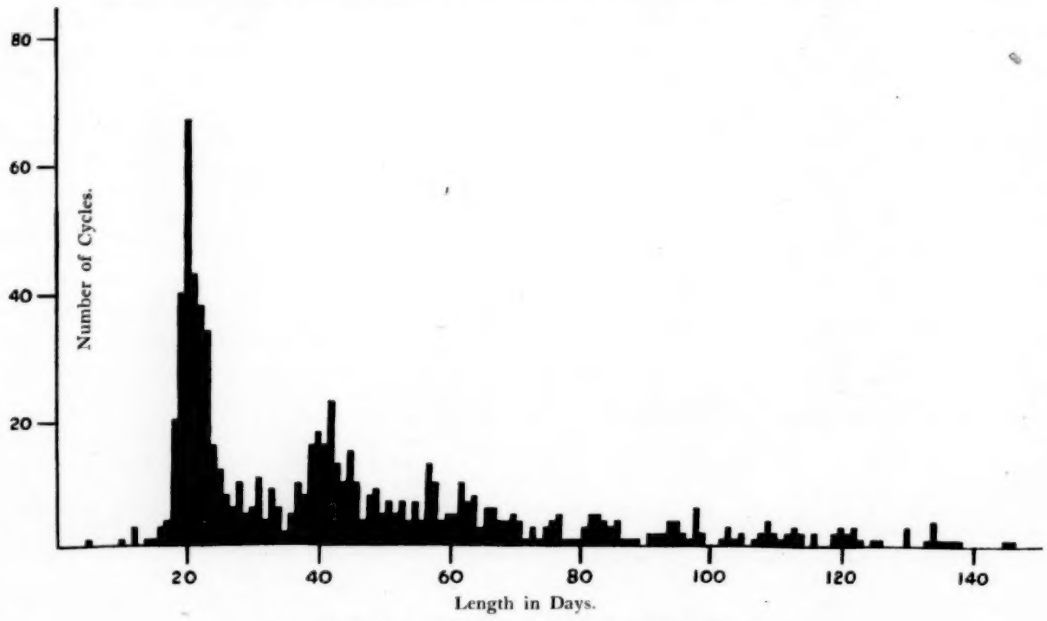

FIG. 1.—Cycle Lengths—Natural Mating Group. N = 774.

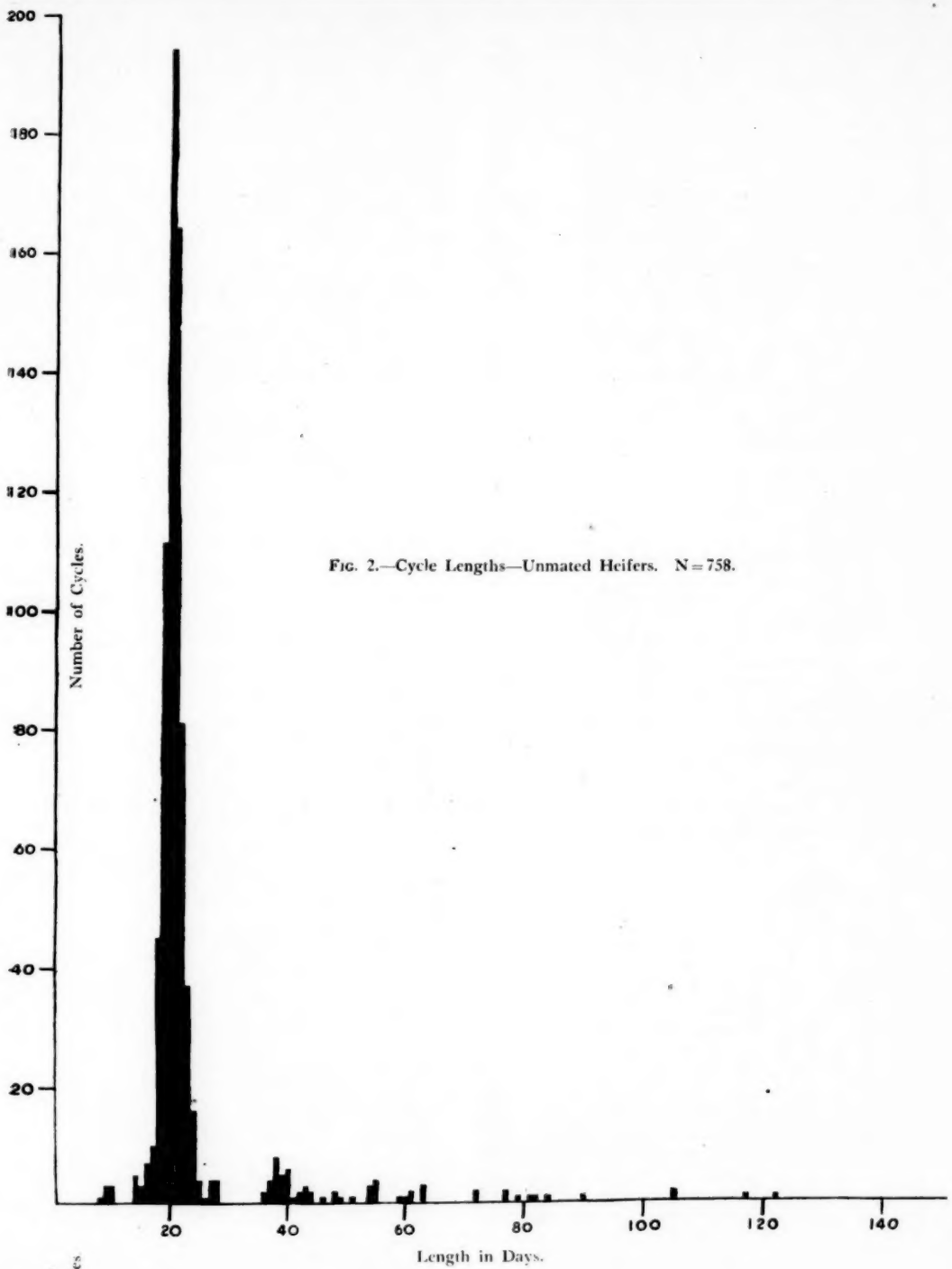

Fig. 2.—Cycle Lengths—Unmated Heifers. N = 758.

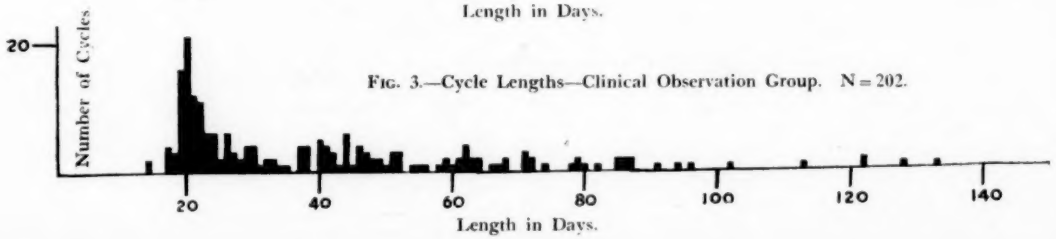

Fig. 3.—Cycle Lengths—Clinical Observation Group. N = 202.

centages was 3·5 and 1·7 respectively. This was much smaller than the 8·6 and 12·1 per cent. shown in the Artificial Insemination Group, and previously commented on by Stewart (1950), whose results were similar to those obtained by Holt (1949 and 1952) and Clarke (1949). However, in this connection the results shown in the Clinical Observation Group are very similar to those obtained by Casida *et al.* (1946) and Barrett *et al.* (1948), who also based their results on early pregnancy diagnosis.

The results contained in Table I do not lend themselves readily to statistical treatment but the fertility level in Herd I (b) of the Natural Mating Group is significantly lower than in I (a), II and III. Also the difference between natural mating and artificial insemination in the Clinical Observation Group was not significant.

Figs. 1 and 2 show the cycle lengths occurring after an infertile mating in the Natural Mating and Clinical Observation Groups respectively. In an attempt to obtain a comparison Fig. 3 was constructed from observations made by Quinlan and Roux (1936) and Quinlan, Roux and Van Aswegen (1939) on the lengths of the oestrous cycle in unmated heifers.

The frequency distribution in Fig. 1 is in marked contrast to Fig. 3 in that a very large number of cycles are longer than 23 days and that there is a marked secondary peak about the 40th day; this feature is not so well marked in Fig. 2 and may be partly accounted for by the smaller number of cycles included.

The general picture can be clearly seen in Table II where, using the same data, the number of oestrous cycles of 0 to 17, 18 to 23 and 24 to 150 days in length are shown as a percentage of the total. Table II shows that there is little difference in the frequency of short cycles occurring in the three groups but that in the mated animals there are relatively few normal cycles and many longer cycles whereas in the unmated animals the majority of the cycles are normal.

TABLE II
CYCLE LENGTHS

Group	Number of cycles	Length of cycles		
		0–17 days	18–23 days	24–150 days
		Per cent.	Per cent.	Per cent.
Natural mating ...	774	1·8	31·3	66·9
Clinical observation	202	3·0	34·1	62·9
Unmated heifers ...	758	4·2	83·4	12·4

CLINICAL OBSERVATIONS

Examination of the genitalia was carried out *per rectum* on 426 cows in the 22 herds described above. The first examination was made within 2 to 14 days following the first service after the previous calving and examinations were then continued at weekly intervals, except for a brief interruption in some of the herds during an outbreak of foot-and-mouth disease, until either the cows had returned to oestrus or 112 days had elapsed. Three veterinary surgeons carried out the examinations and as far as possible each confined his work to certain herds. In order to achieve a reasonable degree of consistency they had previously standardised their technique on abattoir material. The length, breadth and depth of the ovaries were estimated at each examination. These measurements will not be quoted in the results but were of practical value in comparing the results of different examinations in individual cows. Although it must be admitted that clinical examination as an experimental method is usually open to some error, it was found that on a weekly examination of the ovaries the pattern of the oestrous cycle in an individual animal could be assessed with considerable accuracy.

RESULTS

A summary of the clinical findings as a result of the routine examination of the genitalia of all the cows that did not return to service within 28 days is given in Table III. The classifications are based on rectal findings, which can be considered in more detail thus:—

TABLE III
RESULTS OF CLINICAL OBSERVATIONS

Pregnant :—	
(*a*) Pregnancy maintained	222
(*b*) Abortion observed	3
(*c*) Pregnancy diagnosed but not maintained...	9
Corpus luteum persistans :—	
(*a*) *Per se*	49
(*b*) Followed by suboestrus	5
(*c*) Diagnosis doubtful	7
Suboestrus	31
Anoestrus	1
Ovarian cysts	2
Unclassified	3
Total number examined	332

(a) *Pregnant.*—An attempt was made to diagnose pregnancy from the 28th day after service. It was found possible in most cases to do this between the 35th and 49th days, when the diagnosis was based on the characteristic enlargement of the uterine horn and the identification of the foetal membranes. In nine cows pregnancy was diagnosed but not confirmed on subsequent examination. In these cases abortion may have occurred but there was no evidence of this. A positive diagnosis in three other cases was followed by abortion, which occurred on the 32nd, 55th and 91st day respectively. It should be noted that of the 234 animals diagnosed pregnant, 5·1 per cent. did not maintain their pregnancy and 1·3 per cent. were observed to abort.

(b) *Corpus Luteum Persistans.*—The corpus luteum was considered as persisting when it had been identified between the 8th and 14th days after service and remained at approximately the same size until at least the 29th day. This was observed in 49 cases, in which no other changes were recognised, and probably in another seven where there might have been some element of doubt as to the accuracy of the diagnosis. The corpus luteum persisted for longer than 29 days in another five cows and was followed by suboestrus.

Therefore the corpus luteum persisted apparently normally in 55·5 per cent. of cows which did not conceive as a result of the first service and did not return to service within a period of 28 days. The corpora lutea in these cases could not be distinguished, either in size or character, from the corpora lutea of the pregnant cows.

(c) *Suboestrus.*—Suboestrus (Murray, 1943) or "silent heat" are the names applied to that condition in which there is a normal ovarian cycle but no visible sign of oestrus, and which can be diagnosed *per rectum* by following the development and regression of successive corpora lutea. This was recognised in 31, or 28·2 per cent., of the cows that were not pregnant and had not returned within 28 days. Probably a few of these animals did have a

normal oestrus as it was known that in some instances the oestrus may not have been observed because the senior herdsman was absent.

(d) *Anoestrus.*—In this there is complete inactivity of the ovaries with resultant absence of oestrus and the condition is recognised clinically by the absence of a corpus luteum on successive examinations. Only one such case was found.

(e) *Ovarian Cysts.*—Large follicular cysts which persisted for a period of 35 days were found in the ovaries of two cows. This condition, however, did not appear to be of any significance in this investigation.

(f) *Unclassified.*—As frequently happens in a clinical investigation, the findings could not be classified in all animals and on this occasion 2·7 per cent. of the cows under study could not be classified at all.

Discussion

The results of the breeding records studies shown in Table I confirm earlier observations and show that if herd breeding records from natural mating and from artificial insemination are assessed on a non-return to service basis, the percentage actually pregnant is approximately 25 per cent. less than the 28-day non-return figure. There is, therefore, a clear indication that large numbers of dairy cows show a delay in returning to oestrus after an unsuccessful service; this condition is referred to as the suppression of oestrus. The data presented indicate that the condition occurs both after natural mating and artificial insemination and occurs in both to approximately the same degree. There is also a clear indication that the condition is widespread in distribution and frequent in incidence. This view is supported by the work of Casida *et al.* (1946) in the U.S.A., who showed in a study of 3,099 inseminations based on non-return information at 30 to 60 days and at 90 to 120 days that there was a difference of 12·3 per cent. in the conception rate. Similar work by Barrett *et al.* (1948) in the U.S.A. on 4,280 first inseminations showed a drop of 12·1 per cent. and results published by the Milk Marketing Board (1950) in England and Wales on 431,370 first inseminations show a difference of 8·7 per cent. More recently, Holt (1952) in a study of five years' insemination work in Devon and Cornwall, showed that on 29,382 first inseminations the conception rate dropped 11·5 per cent. between the 3- and 12-week estimation and 19·1 per cent. between the three-week figure and the calving percentage. If the data in the Artificial Insemination Group, Table I, are taken on a 30- to 60- and 90- to 120-day non-return basis then a difference of 11·1 per cent. is shown in the period 1944-45 and 9·6 per cent. in 1946. The consistency between all these observations is very striking and the condition would appear to be so universal that it might almost be considered as "normal."

Although it was observed that the drop between the 28- and 56-day figures (approximately 10·0 per cent.) is greater than that for the 56- and 112-day figures (7·5 per cent.) this probably has little significance and the 28- to 112-day difference will be more suitable for comparative study. Small variations in the differences have been noted but at present it is not possible to state whether they have any significance. This is a matter that will be considered in future investigations. However, it is remarkable how similar the two artificial insemination periods are in Table I which does not contain the individual herd bias of the Natural Mating Group. The two parts of the Clinical Observation Group resemble the Artificial Insemination Group in this respect.

The Natural Mating Group is of particular interest when Herd I (a) is considered because it suggests that the condition of delayed return to service has been present in our herds for many years. When comparing Herds I (a) and I (b) of the same table it would appear that the condition is more prevalent during the period of the lower level of fertility, but there is also an indication that it does occur in herds with a history of comparatively good fertility. Further, the breeding records from the herds included in this investigation indicate that the suppression of oestrus occurs in almost all our dairy herds to some degree whether the level of fertility is high or low. The herds used in this study were, with the reservations given, unselected.

The clinical observations in the animals that were not pregnant and did not return within 28 days showed that a condition of corpus luteum persistans was the most frequent finding (55·5 per cent.) and that suboestrus was less common (28·2 per cent.). Anoestrus appears to be of no significance in the study of the problem of suppression of oestrus after an unsuccessful mating and the very low incidence was contrary to expectations.

Suboestrus and anoestrus were the reasons given previously by many people for the absence of oestrus after service but the results of this investigation showed that suboestrus was not the most frequent finding and that faulty observation on the part of the attendants was known to be responsible for only a small proportion of the animals being missed at the normal oestrus periods.

The logical explanation for the maintenance of an apparently functioning corpus luteum is the existence of a pregnancy. This view is well supported in three instances where abortion occurred and in another nine that might have aborted. These cases equally well could have been included in the corpus luteum persistans classification. However, another explanation is suggested by the work of Laing (1945 and 1949), who found in a small carefully controlled experiment involving 48 normal beef heifers that in 12 animals slaughtered within 24 to 72 hours of service a fertilised ovum was recovered from each and that in another 12, which had not returned to oestrus 25 days after service and were then slaughtered, nine had normal embryos on *post-mortem* examination and three had a uterus containing only foetal membranes with no embryo, but with an apparently normal corpus luteum of pregnancy in one ovary. Tanabe and Casida (1949) in a study covering 104 infertile cows showed that the percentage of clinically normal cows having fertilised ova when slaughtered at three days was 66·1 but that at 34 days the percentage having normal embryos had dropped to 23·1, giving an embryonic death-rate of 65·1 per cent.

After considering the experiments of Laing and those of Tanabe and Casida, it is reasonable to conclude that embryonic death is the probable explanation of the maintenance of the corpus luteum beyond the period of the normal oestrous cycle and in the majority of cases also for the suppression of oestrus after an unsuccessful mating. This occurred in 15 per cent. of the cows in the herds under clinical observation. It is not possible from this investigation to make an accurate estimate of the incidence of embryonic death in dairy cattle occurring after the first service, but the figure must lie between 15 and 44 per cent. since Laing recovered fertilised ova from all animals in his experiments slaughtered between 48 and 72 hours after service, indicating that a proportion of the ova were dying before mid-cycle without affecting the animals' return to oestrus. Therefore embryonic death could have occurred in some or all of the 22 per cent. returning within 28 days

and in the 7 per cent. classified as suboestrus. The actual incidence is probably near the higher figure.

In the herds, 14 in all, where suboestrus was found there was also evidence of embryonic death, whereas there was evidence of embryonic death in another five herds in which suboestrus was not observed. Embryonic death therefore might well have some bearing on the aetiology of suboestrus.

The most striking feature revealed by the observations is that the normal pregnancy rate of 55 to 65 per cent. to the first service does not represent the fertilisation rate, which is obviously much higher and probably between 80 and 100 per cent. Therefore, if means could be found of reducing the embryonic death-rate appreciably, it should be possible markedly to raise the fertility level of dairy cattle. This must be the most important problem of bovine fertility at the present time.

Unfortunately the investigations described here offer no guidance in respect of the aetiology of early embryonic death, but it must arise either from a defect in the spermatozoon or ovum at the time of fertilisation or from an unsuitable tubal or uterine environment. In this connection it is interesting to note that both Laing (1949) and Casida (1950) postulate that the most likely explanation is a defect of the ovum, such as might arise from ageing. Casida cites an experiment of Barrett (1948) in support of this and Laing quotes his own observations.

Other workers have considered that early embryonic death results from specific causes associated with the environment of the cow. Hignett (1949) suggests that embryonic death following luteal deficiency (as a result of a poor-quality corpus luteum) can be caused by mineral imbalance in the diet, and Sjollema, Stegenga and Terpstra (1949) and Stegenga (1950) state that it occurs as a symptom of enzootic sterility associated with *Vibrio foetus* infection. However, if both of these suggestions were correct it would mean that embryonic death is a symptom of infertility associated with a number of conditions of different aetiology. If there is a single causal factor postulated, then that factor must be present in almost all dairy herds. In the present state of knowledge the symptoms of irregular or delayed return to oestrus after service cannot be taken as suggesting a specific condition.

Summary

1. An investigation was made into breeding efficiency of dairy cattle served either by natural mating or artificial insemination.

2. Approximately 18 per cent. returned to service within 28 days and approximately 25 per cent. after 28 days. This occurred when either method of mating was employed.

3. This delay in returning or suppression of oestrus after an unsuccessful mating is an important and widespread factor in the problem of bovine fertility.

4. Clinical observations made on 110 cows showing suppression of oestrus revealed that in 61 cases there was persistence of the corpus luteum, in 31 suboestrus, and in 12 pregnancy, although diagnosed, was not maintained. The findings in the remainder were of no significance.

5. The reason for the persistence of the corpus luteum is discussed briefly and it is concluded that early embryonic death is the explanation.

6. If means could be found of reducing appreciably the embryonic death-rate, it should be possible to raise markedly the fertility level of dairy cattle.

7. The possible aetiology of the condition is also discussed but there is not sufficient information available at present to draw any conclusion.

Acknowledgments.—The author is indebted to the herd owners for their valuable co-operation in providing the breeding records and the facilities for the clinical work, to his colleagues, Mr. D. R. Melrose and Mr. W. R. Wilson, for their valuable help, particularly in respect of the clinical examinations, and to members of the staff of the Reading Cattle Breeding Centre for general assistance. Much helpful advice was received from Dr. A. T. Cowie, Sir Thomas Dalling, Dr. H. H. Holman, Dr. J. A. Laing and Dr. A. W. Stableforth.

References

Asdell, S. A. (1946.) "Patterns of Mammalian Reproduction." New York.
Barrett, G. R. (1948.) Thesis cited by Casida, L. E. (1950.) *Vlaam. geneesk. Tijdschr.* **19.** 273–283.
———, Casida, L. E., & Lloyd, C. A. (1948.) *J. Dairy Sci.* **31.** 682–683. Abstr.
Casida, L. E. (1950.) *Vlaam. geneesk. Tijdschr.* **19.** 273–283.
———, Barrett, G. R., & Lloyd, C. A. (1946.) *J. Dairy Sci.* **29.** 553–554. Abstr.
Clarke, R. (1949.) *Vet. Rec.* **61.** 861–863.
Hignett, S. L. (1949.) *Proc. 14th Int. Vet. Cong., London.*
Holt, A. F. (1949.) *Ibid.*
———. (1952.) *Vet. Rec.* **64.** 31–36.
Laing, J. A. (1945.) *Ibid.* **57.** 275–279.
———. (1949.) *J. comp. Path.* **59.** 97–107.
———. (1950.) *Vet. Rec.* **62.** 186.
MacGregor, J. J. (1941.) *Vet. J.* **97.** 340–344.
Milk Marketing Board. (1950.) Report of the Production Division No. 1.
Murray, J. G. (1943.) *Vet. Rec.* **55.** 323.
Quinlan, J., & Roux, L. L. (1936.) *Onderstepoort J. vet. Sci.* **6.** 719–772.
———, ———, & Van Aswegen, W. G. (1939.) *Ibid.* **12.** 233–247.
Sjollema, P., Stegenga, Th., & Terpstra, J. (1949.) *Proc. 14th Int. Vet. Cong., London.*
Stegenga, Th. (1950.) "Vibrio foetus and Enzootic Sterility." Utrecht (Publisher, Author).
Stewart, D. L. (1950.) *Vet. Rec.* **62.** 389–395.
Tanabe, T. Y., & Casida, L. E. (1949.) *J. Dairy Sci.* **32.** 237–246.

Royal Sanitary Institute

The Royal Sanitary Institute has accepted an invitation from the Corporation of Hastings to hold the 1953 Health Congress in Hastings from Tuesday, April 28th, to Friday, May 1st, inclusive.

Particulars of other meetings of the Institute are as follows:—

Portstewart (Northern Ireland) Sessional Meeting, Saturday, June 7th, 1952, at 10.15 a.m., in the Town Hall, Portstewart. Papers on "A Review of Meat Inspection Practice in Northern Ireland," by A. M. Logue, County Sanitary Officer, Co. Londonderry; "Food Handling," by Dr. Percival V. Pritchard, County Medical Officer, Co. Antrim, and "B.C.G. Vaccination," by Dr. J. N. Whyte, Physician, Northern Ireland Tuberculosis Authority. Afternoon: visits to places of interest.

London Sessional Meeting, Wednesday, June 11th, 1952, at 2.30 p.m., at the Institute. Paper on "The Incidence of *Mycobacterium tuberculosis* in Various Types of Raw and Heated Milk with Observations on the Control of the HTST Process," by J. G. Davis, PH.D., F.R.I.C., Director (Technical), Express Dairy Co. Ltd.

Scarborough Sessional Meeting, Friday, July 4th, 1952, at 10.30 a.m., in the Concert Room, Public Library, Vernon Road, Scarborough. Papers include "Anomalies of the Law Relating to Milk-borne Infection," by G. D. Aspin, Chief Health Inspector, North Riding C.C.

* * * * *

Weekly Wisdom

There can be no greater mistake than the casual creation of new crimes.—Mr. R. T. Paget, M.P.

* * * * *

An agricultural library, the largest in Europe, is to be formally inaugurated in June at the headquarters of the Food and Agricultural Organisation of the United Nations in Rome. Known as the David Lubin Memorial Library, it consists of the libraries belonging to the International Institute of Agriculture, the International Sylvicultural Centre and the F.A.O.

CLINICAL COMMUNICATION

AVIAN TYPE TUBERCULOSIS OF THE BOVINE UDDER

P. STUART AND P. M. MARSHALL,
MINISTRY OF AGRICULTURE AND FISHERIES

Introduction.—Wolters and Dehmel (1931) reported the isolation of avian type tubercle bacilli from milk samples of 14 cows, but none of these animals showed any clinical evidence of tuberculous mastitis. Only two cases in which there were macroscopic lesions of the udder caused by tubercle bacilli of the avian type have been described—Timoney (1939) and Ottosen (1944). It is possible, however, that such cases may be more frequent than the literature would indicate, since the inoculation of guinea-pigs which is usually used for the final diagnosis of tuberculosis in the bovine does not always detect avian infections. The object of this contribution is to record another case in which clinical mastitis and macroscopic lesions of tuberculosis of the udder were present.

History of animal and herd.—The cow concerned was newly calved and was giving 5 gallons of milk daily. No abnormality had been noticed by the owner but a clinical inspection of the udder revealed an induration indicative of tuberculosis. Acid-fast bacilli and endothelioid cells in " cell groups " were found in films of the milk sediment. A specific reaction to avian tuberculin was obtained in the comparative intradermal tuberculin test, the increase in skin measurement being 4 mm. to avian and 1 mm. to mammalian. In this herd, which was attested, seven out of the total 21 cattle reacted specifically to avian tuberculin and none specifically to mammalian. The 10-day-old calf of the affected cow was included in the herd test but gave no reaction to either tuberculin. The number of avian reactors increased to 16 at a tuberculin test six months after this case was discovered. Some 50 poultry were kept on the pasture but these were removed before the incidence of tuberculosis amongst them could be ascertained.

Post-mortem *findings.*—The cut surface of the udder had the mottled appearance often seen in early cases of tuberculosis. The supramammary lymph nodes contained lentil-sized areas of commencing necrosis and firm pea-sized caseo-calcified lesions were found in several enlarged mesenteric nodes. There were several pea-sized lesions under the capsule of the liver. An area of diffuse peritonitis was also present. Specimens of these lesions (except the peritoneum) were examined at the laboratory.

Laboratory Tests

Microscopic.—Acid-fast bacilli readily were found in films from the udder and lymph node lesions and, although these were somewhat more pleomorphic than usual, they could not be differentiated definitely from bacilli of the bovine type by their morphology.

Biological.—Material from all the lesions was pooled and inoculated into two guinea-pigs. These reacted to avian but not to mammalian tuberculin when tested three weeks later. The guinea-pigs were killed eight weeks after inoculation and on *post-mortem* examination only the local lymph nodes were affected, being enlarged and slightly caseous. An emulsion of these nodes was inoculated into two further guinea-pigs which showed no lesions of tuberculosis on *post-mortem* examination eight weeks later.

Cultural.—The pooled material from the lesions was also sown into Dubos liquid medium which was incubated for two weeks, when it contained numerous pleomorphic acid-fast bacilli which were subcultured on Dorset's egg, Lowenstein-Jensen's medium, potato slopes and broth, on all of which the growth was rapid and characteristic of the avian type. Two guinea-pigs, two rabbits and two chickens were inoculated, one of each with 0·1 mg. and one with 0·01 mg. of culture, the guinea-pigs subcutaneously and the rabbits and chickens intravenously. The guinea-pigs had only local lesions when killed at eight weeks. One rabbit and one chicken died in the fourth week after inoculation with widespread pin-head lesions of tuberculosis. The remaining rabbit and chicken were killed at 10 weeks; both had numerous lesions of tuberculosis in the liver and spleens in which numerous acid-fast bacilli were present and avian type growth was cultured from them.

Histopathology

Udder.—The lesions were extensive but the granulomata were apparently not of a very virulent type. They seemed to be of a considerable age and contained many giant cells and lymphocytes but there was little evidence of caseation. In some areas there was marked fibrosis. The oldest lesions were in the interlobular tissue but the acinous tissue was also affected. Many cells were present in the alveoli, including lymphocytes, polymorphonuclear leucocytes, acidophyles, and a few multinucleate giant cells.

Supramammary Gland and Liver.—Several discrete lesions of the same lymphocytic type, containing numerous giant cells, were present.

Mesenteric Gland.—This was severely affected and contained the oldest lesions. Although necrosis of the tissue and extensive giant cell formation were evident the predominant feature was the presence of fibrous tissue strands throughout the whole section.

Discussion

Natural infection of cattle with avian tubercle bacilli has usually no tendency to generalisation but fairly extensive lesions have been reported occasionally by a number of workers. It is not possible to differentiate these lesions from those of bovine type infections by their macroscopic appearance nor by the morphology of the bacilli, but the comparative intradermal tuberculin test indicated the type clearly in the case reported here and in others diagnosed recently.

Involvement of the udder is apparently rare but infection of the uterus with resultant abortions has been described by Plum (1938). Ottosen (1944) drew attention to the frequency with which the serous membranes are involved and it is probable that the peritonitis in this case was tuberculous, although this was not proved. In three out of the remaining four cases of avian tuberculosis in cattle diagnosed in this laboratory during 1950 the pleura or peritoneum, or both, were affected.

References

OTTOSEN, H. E. (1944.) *Skand. vet. Tidskr.* **34.** 1.
PLUM, N. (1938.) *Acta. path. microbiol. scand.* Suppl. **37.** 438.
TIMONEY, J. F. (1939.) *Vet. Rec.* **51.** 191–243.
WOLTERS, K. L., & DEHMEL, L. (1931.) *Z. InfektKr. Haustiere.* **39.** 102.

ANNOTATION*

ENERGY FEEDING STANDARDS FOR DAIRY CATTLE

Of recent years much has been learned concerning the existence and treatment of various forms of nutritional deficiency in cattle. Copper deficiency is one example, and relative insufficiency of phosphorus is another, while veterinary surgeons in certain parts of East Anglia are familiar with avitaminosis A. Greater than any of these in its economic importance, however, is the present-day shortage of dietary energy. Since imported feeding-stuffs became scarce it has been a much more difficult task to supply our cattle with sufficient energy in their diets. Home-grown foods vary enormously in range and composition, but they tend to provide a coarser and bulkier diet than imported cereal grains and oil cakes, and one that is much lower in energy value.

It is therefore an opportune time to review energy feeding standards for dairy cattle. In a characteristically thorough manner Blaxter (1950) has done this, and his paper contains much that is relevant to the proper understanding of feeding problems. His main conclusions, in so far as they are of interest to veterinarians, may be summarised as in the following paragraphs.

Effect of Maternal Energy Supply on Foetal Growth and Development.—Foetal growth in cattle as affected by the supply of feed energy to the dam has not been studied in detail as in sheep. Partial starvation of pregnant unacclimatised European cattle, as a result of grazing in semi-arid, sub-tropical conditions, has been found to lead to the birth of calves some 20 per cent. lighter than those born at a more favourable time of the year. In experiments in which cows have been fed at different levels in late gestation, a small increase in the birthweight of the calves has generally been associated with the higher plane of nutrition. In extreme under-nutrition the viability of the calf is affected. The birthweight of Dairy Shorthorn calves in the Shinfield herd fell from a pre-1940 average of 87 lb. to an average of 79·9 lb. in the war and post-war years.

Effect of Nutritional Plane on Post-natal Growth and Development.—In many areas of the world cattle alternate between under-nutrition during winter or drought and "normal" nutrition in summer or the rainy season. The growth of dairy cattle reared in favourable conditions, however, shows no indication of periodicity of nutritional plane, and in favourable circumstances this is true in Great Britain (Bartlett & Jameson, 1932). Owing to seasonal or local shortages and excesses of food cattle may alternate between under- and over-nutrition, and there was evidence of this in Great Britain during the war years (Blaxter & Price, 1946). When food supplies permit of weight maintenance only, growth is not stopped completely, for the animal continues to increase in linear dimensions at a greatly reduced rate, and protein and water are stored while body fat is catabolised. A spurt of growth occurs after such retardation when supplies of food permit. This has been observed in experiments in which cattle have been fed on different planes of nutrition and then turned out to grass during the summer. Feeding standards for growth should take into account not only the crude rate of weight increase but also the composition of that increase. At a given age, the animal that is heavy for its size will require relatively more energy to increase its weight, since it will be laying down more fat than an animal that is smaller and relatively lighter at the same age.

Reference is not made to the publication from Aberystwyth of Phillips (1946), who found that in dairy heifer calves, even on a College Farm from 1927 onwards, there was a marked seasonal periodicity in growth rate, and a relationship between season of birth and subsequent rate of gain. It can only be concluded that the conditions even in those years were sub-optimal, and that there must, unfortunately, be many calves in Great Britain that are similarly subject to seasonal variations of this kind.

Other things being equal, rate of gain in weight and final body dimensions are genetically determined, but the effect of nutritional plane on growth is nevertheless marked. Additional energy beyond the optimum required for growth leads to fat deposition. Insufficient energy results in reduced growth and in prolongation of the growth period. Prolongation of the growth period by suboptimal feeding results not only in reduced bodyweight but in changes in conformation at a stated age. When animals are compared at the same bodyweight the more slowly-growing and consequently older animal will tend to be relatively taller at the withers and to have a larger head but a narrower chest and a smaller girth. The soft tissues of a slowly maturing animal contain more protein and water and less depot and subcutaneous fat than those of an animal that has reached the same weight in a shorter time. Prolonged under-feeding of steers has been shown to reduce final body size but not to have much effect on "conformation."

Effect of Nutritional Plane on Milk Secretion.—In a herd carefully rationed on one feeding standard the individual variation in milk yield may to a considerable degree be determined by genetic factors—in such circumstances the genetic portion of the total variance may be as high as 30 to 40 per cent. In practice, however, the effect of under-feeding or improper feeding may be very great indeed. The innate capacity of a cow to produce milk cannot be judged until properly balanced rations are supplied to appetite. Realisation of this has modified the attitude of scientists to less well-known breeds, whose milk yields under good conditions have been found to be far in excess of those usually obtained in their natural environment. Continued under-feeding of a cow, either by restriction of the allowance of a given ration or by supplying a ration of low available energy per unit weight, results in a decline in milk yield. The percentage of fat declines only when under-nutrition is prolonged. Short periods of under-nutrition, in which yield falls rapidly, are associated with increases in fat percentage. The percentage of solids not fat of milk falls during partial energy deprivation. This decline is probably due to depletion of body protein reserves by animals in negative energy balance. Similar changes in composition have been induced by specific protein depletion experiments. Many of the results of under-feeding are, however, related to reductions in the intake of dietary essentials other than energy, *i.e.*, under-feeding often implies malnutrition.

Under farm conditions the danger of under-feeding arises not only from shortages of feeding-stuffs but also from lack of knowledge of the potential yields of individual cows. In general the success of a lactation depends on the level of production established during the first six weeks. The custom of adjusting rations at intervals of one to two weeks according to milk yield in the preceding interval may not provide for the maximum possible rate of increase. This will be true especially if the cow has not been well fed during the dry period. Milk secretion in the early stages is partly at the expense of body fat and protein, and this holds until equilibrium is established between maintenance energy

* Prepared at the request of the Editorial Committee in lieu of an extended abstract.

requirement, the urge to produce milk, and the energy provided by the feed. The effect of good feeding would be expected to be greatest in early lactation, and it has been demonstrated in practice that it is small in mid to late lactation (Blaxter, 1944). This may justify the practice of feeding in advance of the yield until peak production is attained.

The maximum yield for any cow depends on her capacity to ingest and digest food and on the capacity of her udder. Digestive disturbances may occur at high levels of feeding (Jensen *et al.*, 1942), but so long as the level does not grossly exceed the animal's capacity to produce milk there is no reason to expect excess deposition of fat. There will, on the other hand, be improvement in condition.

A high level of feeding during the dry period may increase the subsequent capacity of the cow to consume quantities of feed commensurate with high production. The results of such feeding have not always been good, however, due possibly to deposition of fat in the mammary tissue.

By a combination of high feeding, frequent milking and the best possible management and handling, astonishing increases in yield have been obtained.

Utilisation of Dietary Energy on Different Planes of Nutrition.—The metabolisable energy or available energy of a ration is its gross energy less the energy of the methane and excreta. In ruminants, faecal energy represents the largest proportion of the loss. Whether the metabolisable energy per unit weight of ration alters with rising nutritional plane depends almost entirely on whether or not a change in digestibility occurs.

From a consideration of relevant studies the main conclusion is that the law of diminishing returns applies to productive processes in general and that the theoretical upper limit of production would occur at a level of intake that is beyond the animal's feed capacity.

What Determines the Most Desirable Level of Production.—When reliance has to be placed almost entirely on home-grown foods, the decision to be made by the farmer is a very complex one. He has to decide whether to maintain more animals at a lower intensity of feeding, or fewer at a higher one. Capital investment and labour and management costs have to be taken into account, and in choosing the economic optimum productive level such considerations as managerial efficiency, length of herd life, the inherent capacity of the stock and transport difficulties have all to be reckoned with.

It is impossible to obtain high levels of production from rations of low net energy value, partly because such rations as a rule are not sufficiently appetising. Appetite, in the sense of the bulk of the food that a cow will take, is measured in terms of weight of dry matter, indigestible organic matter, indigestible dry matter ("ballast") or volume of feed ingested each day. None of these criteria can explain the differences in feed intake in practice when cows or heifers are fed to appetite, nor does the bovine animal regulate its appetite according to its energy requirements. From the mass of published information one generalisation is possible : the amount of food taken, measured in terms of dry matter, increases with increasing concentration of the ration (net energy per kg. dry matter). This suggests that indigestible residue has some influence on feed capacity. There are exceptions even to this generalisation. Differences in palatability are highly important (*e.g.*, a low appetite for silage rations), as are individual food preferences. There are also unexplained breed differences in the amounts of food habitually consumed.

Maintenance Energy Requirements.—By definition the maintenance energy requirement of an animal is equal to its basal expenditure plus the net energy cost of incidental muscular activity. The basal metabolism of a ruminant has seldom been determined, since complete muscular repose in a post-absorptive state can rarely be attained. Most published estimates represent "fasting heat production," in which activity is not controlled, or "resting heat production," in which, while the animal is lying and activity is controlled, the length of fast is insufficient to ensure a post-absorptive state. Neither the fasting nor the resting heat production of cattle is stable : both are affected by the previous nutritional plane, by the physiological state of the animal, and by its surroundings. Stable values are obtained only under highly standardised conditions. The variation in resting heat production of mature cows appears to be of the order of ± 15 to 25 per cent. of the mean value. Visible light (which probably affects posture) and muscular activity would appear to have marked effects on maintenance energy requirements, and in view of the variables involved conventional maintenance requirements can be regarded only as crude averages and not in any way as exact requirements for every individual cow. On the other hand, feeding standards in practice are employed chiefly for stall-fed cows, and so the variations due to activity and light are at a minimum.

Net Energy Cost of Growth and Fattening.—By definition the net energy expended on growth and fattening is equivalent to the energy stored. Growth is the deposition of protein, ash and water with little fat ; fattening is the deposition of fat with only a small storage of protein. There is, however, no clear line of demarcation, and the energy equivalent of a gain in bodyweight will vary from values as low as 1,700 cal. per kg. in the young animal to 8,000 cal. per kg. in the mature adult depositing fat. To estimate the net energy requirement for growth it has to be assumed that at physiologically equivalent ages, *i.e.*, when the same fraction of mature weight has been attained, growing cattle put on gains of the same percentage composition, irrespective of type and breed, and that only a minimum of fattening occurs.

Net Energy Cost of Milk Secretion.—The net energy value of milk secretion is by definition equal to the energy value of the milk. It was suggested over 20 years ago that the energy value of milk was proportional to its fat content and could be estimated from a linear equation. Although more elaborate formulae have been proposed, no great error seems to arise in this original contention. It is satisfactory to express milk yield in terms of fat-corrected milk (F.C.M.) containing 4 per cent. fat in order to deal with a product of standard energy value of 750 cal. per kg., or 340 cal. per lb. The net availability of metabolisable energy for milk secretion is higher than that for fattening.

The Expression of Feeding Standards.—A simple summation of maintenance energy and of the energy of storages and secretions in terms of net energy will not give a reliable feeding standard. While the total net energy requirement may be correct, the difference in availability of digestible nutrients or metabolisable energy for growth, fattening, milk secretion and maintenance makes it impossible to translate the net requirement directly into terms of a supply of feed. One of two devices has therefore been employed, *viz.* (i) to compute all requirements to the equivalent of the net energy for one productive function, *e.g.*, to express the net energy cost of maintenance or milk in terms of the net energy cost of fattening ; or (ii) to express requirements in terms of metabolisable energy as a step towards their expression as digestible nutrients. For simplicity it has been the custom to express net energy requirements not in terms of heat but in terms of a reference feed, *i.e.*, the net energy of starch or barley. The net energy for fattening of 1 kg. of starch was determined by Kellner, and later it has been shown that the mean value is subject to considerable variation, as also is the net

availability of the metabolisable energy of any single feed, which depends upon the basal ration and the plane of nutrition. This variation does not, however, invalidate the use of a unit of starch or barley as an energy unit, provided that the N.K.E. (*i.e.*, the net energy equivalent for fattening) is rigidly defined.

The reader is referred to the original review for an extended study, with tables, of the different primary feeding standards that have from time to time been introduced, *viz.*, those based on calorimetric data (Armsby, 1917 ; Wood, 1924 ; Mollgaard, 1929), those based on feeding trials (Haecker, 1914 ; Hansson, 1925 ; Frederiksen, 1931 ; Forbes & Kriss, 1932), and those derived from the mathematical treatment of specific feeding experiments or of data obtained under herd conditions (Armsby & Moulton, 1925 ; Brody & Proctor, 1935 ; Gaines, 1943), and for a discussion of the many modifications of these primary standards introduced by American, British and European workers.

Methods of Feed Evaluation and the Energy Values of Feeds in Relation to the Energy Feeding Standards.—The tables of feed values are as much an integral part of any feeding system as are the standards of requirements themselves. It is desirable in any system that a unit from one feed, however expressed, should be exactly equivalent to a unit from another feed, *i.e.*, the units must be equivalent and additive. The T.D.N. (total digestible nutrients) system must be excluded from this generalisation, however, for it does not pretend to provide information on relative values. With the other systems there are large divergences in equivalence value, due in part at least to divergences of opinion or the extent to which the net availability of metabolisable energy is affected by the composition of the diet. More specifically, it is a question of the extent to which the fibre content and protein content of the diet affect availability. There have been many opinions as to the effects of the balance of constituents upon availability of metabolisable energy and Kriss (1943) and his colleagues believe that the net energy of a ration is not necessarily equal to the sum of the net energy of the individual feeding-stuffs.

These considerations apply when the digestible nutrient content of a feeding-stuff is known. There are, of course, variations in the composition of foodstuffs, especially roughages, from place to place and from season to season. The range of variation in chemical composition and digestibility is well known, and the identification of a particular sample of a feeding-stuff with one listed in the feeding tables is associated with errors often exceeding ± 10 per cent.

Use of Feeding Standards in Practice.—The use of a particular feeding system to compute the requirements of an individual cow in terms of daily feed is unreliable, because the cow *is* an individual. Attainment of a particular level of production by a cow involves consideration of her innate capacity for lactation, her feed capacity and her metabolic efficiency, and depends on the available feed supply and a range of economic and managerial items. The standards are but rough guides and can never replace the "art of the feeder," so far as the individual cow is concerned. The rigid use of a particular feeding system may give rise to physiological under-nutrition of individual cows within a herd. When this happens the immediate response is an attempt by the cow to adapt herself to the energy supply, and this in turn must mean curtailment of production. Physiological over-nutrition implies that the capacity to lactate has been exceeded, and here adaptation consists of the dissipation of excess energy in spendthrift oxidation or in the deposition of unwanted fat, sometimes in the mammary gland, so further reducing milk yield.

Though the energy feeding standards are of secondary importance in caring for the individual cow, they should, nevertheless, apply to averages of large numbers of cows, to herds and to the cow population of particular areas. They should, therefore, find their greatest use in the planning of the cropping of a farm or an area for the provision of cattle feed, or in the purchase of feeding-stuffs. Here again, however, there are limitations. The standards do not appear to be true statistical averages of individual requirements, while the evaluation of the physiological efficiency of feeding-stuffs is not yet agreed, and their ranking varies from authority to authority. "These limitations are of vital importance in any planning of feed supplies and of stock carrying capacity, and should occasion grave concern to those whose business it is to plan production, whether for a farm, a dairy farming area, or some larger area of the world."

[This article deals largely with energy as such. It has been pointed out that steps necessary to correct deficiency of dietary energy—or of protein—should not involve lowering of the roughage to a degree that may precipitate equally important deficiencies. Thus, lowering of the roughage intake below a certain level has been found, in this country and elsewhere, to result in a fall in butter-fat excretion, associated probably with diminished fatty-acid production in the rumen.]

A. N. W.

References

Armsby, H. P. (1917). *The Nutrition of Farm Animals.* New York : Macmillan.

———, & Moulton, C. P. (1925.) *The Animal as a Converter of Matter and Energy.* New York : Chemical Catalog Co.

Bartlett, S., & Jameson, J. L. (1932.) *J. Dairy Res.* **3.** 310.

Blaxter, K. L. (1944.) *J. agric. Sci.* **34.** 213.

———. (1950.) *Nutr. Abstr. Rev.* **20.** 1. ("Energy feeding standards for dairy cattle.")

———, & Price, H. (1946.) *J. agric. Sci.* **36.** 301.

Brody, S., & Proctor, R. C. (1935.) *Res. Bull. 222 Univ. Missouri agric. exp. Sta.*, 113.

Forbes, E. B., & Kriss, M. (1932.) *Proc. Amer. Soc. anim. Prod.*, p. 113.

Frederiksen, L. (1931.) *Forsogslab. Kobenhavn Beretn.*, No. 136.

Gaines, W. L. (1943.) *J. anim. Sci.* **2.** 304.

Haecker, T. L. (1914.) *Bull. 140 Univ. Minnesota agric. exp. Sta.*

Hansson, N. (1925.) *Meddel Centralanst. Forsöks., Stockholm.* No. 296.

Jensen, E., Klein, J. W., Rauchenstein, E., Woodward, T. E., & Smith, R. H. (1942). *Tech. Bull.* **815.** *U.S. Dept. Agric.*

Kriss, M. (1943). *J. anim. Sci.* **2.** 43.

Mollgaard, H. (1929.) *Fütturungslehre des Milchviehs.* Hanover : M. and H. Schaper.

Phillips, R. (1946.) *Nature, Lond.* **158.** 202.

Wood, T. B. (1924.) *Animal Nutrition.* London : University Tutorial Press.

R.C.V.S. PHARMACOLOGY, ETC., EXAMINATION, MAY, 1952

List of Successful Candidates

London :

Basinger, Donald.
Douch, J. A.
Downes, J. E.
Eden, R. M. G.
Epps, H. B. G.
Fry, N. C. V.
Gillett, T. G. F.
Hambrook, C. L. E.
Hooker, Miss P. M. W.
Jones, M. D. B.
Keep, M. E.
Menard, F. R. J. R.
Morgan, D. B.
Nelson, D. G.
Shaw, D. L.
Stockwell, G. D.
Thomas, J. L.
Tuckey, J. B.
Watson, K. R.
White, R. C.
Williams, J. R. L.

(*To be continued.*)

REVIEWS

[The National Formulary, 1952. Pharmaceutical Press, London. Pp. 196. Price 4s. 6d. ; interleaved, 7s. 6d.

This little book, published under the auspices of a Joint Formulary Committee appointed by the Medical and Pharmaceutical professions, first made its appearance in 1949 and was so well acclaimed that a second edition has become necessary in such a short space of time. This latest edition has been enlarged and revised, and although it is essentially a handbook for the medical profession, it contains much of veterinary interest.

Under a heading "Notes to Prescribers," some "First-aid Treatments in cases of Poisoning" are described and many of the antidotal measures recommended could be applied in animals with suitable adjustments. This section also deals with the essential actions and uses of some of the antibiotics such as penicillin, streptomycin, aureomycin and chloramphenicol. The sulphonamides, analgesics, antihistaminics, vitamins and hormones are dealt with similarly.

A new section entitled "Pharmacological Classification" has been added and will be of immense value to all prescribers of drugs as it enables one quickly to ascertain what range of preparations have a similar pharmacological action. Each drug and its preparations have been classified under various headings according to their predominant action, such as Drugs Acting on Infections, Drugs Acting on the Alimentary, Cardiovascular and Central Nervous System, etc.

The Formulary, which forms the main part of the book, has been well pruned when compared with the first edition, and only those preparations which are now considered by the Formulary Committee to be of importance have been included, with the result that many drugs which were favourites a few years ago are no longer advocated. An innovation in this section is the introduction of English headings to the various sub-sections, *e.g.*, Eye Drops, instead of Guttae, Ointment for Unguenta, which makes for easier grouping.

An attempt has also been made to group some of the proprietary preparations with equivalent drugs and preparations of the B.T. and B.P.C. according to (1) those regarded as being identical, and (2) those having an analogous therapeutic effect. Such groupings serve to elucidate a problem which daily becomes more confusing.

The book, at such a low cost, is excellently produced, and the reviewer is of the opinion that a book on similar lines would prove a useful adjunct to the veterinary literature, both for clinicians and students.

* * * * *

[1952 Supplement to the British Pharmaceutical Codex, 1949. Pharmaceutical Press, 1952. Pp. xii + 148. Price 25s.]

This supplement serves to bring up to date the British Pharmaceutical Codex published in 1949. Many of the existing monographs have been amended in accordance with recent developments in the testing and assaying of drugs. Thirty-six new monographs of drugs recently introduced into medicine have been added ; of these, 14 already have been described in the 1951 Addendum to the British Pharmacopoeia whilst the remaining 22 are entirely new. Among the more important drugs now included are aureomycin, chloramphenicol, streptomycin, ethinyloestradiol and gammexane.

As is customary with the B.P.C., the main actions and uses of the drugs are also described. The book is essentially a "Supplement" to the parent volume and is mainly one of reference for the pharmacist and the pharmaceutical chemist.

NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY

COUNCIL MEETING IN MANCHESTER

A Council Meeting of the Society was held in Manchester on March 20th, 1952, Mr. John Holroyd presiding. The President opened the meeting by referring to the death of Mr. H. W. Steele-Bodger, saying that his good work for the profession had been fully reported and was well known to all present. He called on the members to stand in silence as a tribute to his memory.

Defence Fund Claims

Nine cases brought forward from the previous meeting and 12 new cases were considered. One case had been settled in the sum of £70 and one case through the solicitors at a cost of £36 12s. 9d. A Court case had been decided in favour of the Society, with approximate expenses to the claimant of £120. A number of cases had been cleared through the solicitors or through the Hon. Secretary, and in three instances the matters raised were outside the scope of the Defence Fund. Other cases dealt with included the following :—

Case No. 25/51. A dog in for attention to teeth. Teeth found encrusted with tartar and several dropped out on scraping. Examination revealed considerable pyorrhoea and members extracted 15 affected teeth. Claim on grounds there was no authority for extraction. Case taken to Court and awarded in favour of claimant with damages for "trespass." Total costs to the Society, £80 4s. 6d.

Case No. 27/51. Claim of £60 for value of heifer. Assistant punctured uterus with Nielsen catheter. No assistance available as practitioner was not member under Defence Section.

Case No. 1/52. Horse sold certified as sound, subsequently found to be lame by two independent veterinary surgeons. A further report indicated probable lameness at date of purchase. Case settled through solicitors at a cost of £80 4s. 0d.

Case No. 2/52. A number of dogs boarded out and inspected by member periodically. Pneumonia infection broke out and 12 dogs died or had to be destroyed. Member's solicitors advised to prepare defence of counter-claim on behalf of Society.

Case No. 6/52. Piglets treated for piglet pneumonia. After a number of visits member's services were terminated. A second practitioner called in and diagnosed swine fever and claim arose for incorrect diagnosis. Case referred to solicitors for defence as necessary.

Case No. 7/52. Enquiry *re* loss of pedigree bull which died under chloroform anaesthesia given for dis-horning operation. Member advised on procedure.

Other Matters

Other matters dealt with included :—

Benevolent Grants.—The circumstances of two grantees were fully considered and appropriate action was taken in both cases.

Students and Assistants.—Doubt appeared to remain in the minds of some members as to whether subscription of £3 3s. 0d. for an assistant and insurance of 5s. 0d. for student covered any student or assistant, including any replaced in same year. Council confirmed that such subscriptions and insurances did in fact include replacements effected in the financial year.

(*Concluded at foot of column* 1, *page* 314.)

THE NEW FITYZWYGRAM, WILLIAMS, WALLEY AND LAWSON PRIZES

On the principal staircase of the Royal College of Veterinary Surgeons, immediately outside the Council Chamber door, is a full-length portrait of a serious man. The great gilt frame, with a painted coat of arms at the top, gives little relief to his black frock-coat of 1889 and the sombre background of the picture. To the base of the frame is attached, with the appearance of being about to fall off, a gilt scroll. This reads :—

> "Presented to Major-General Sir Frederick Fitzwygram, Bart., by the Members of the Royal College of Veterinary Surgeons as a mark of their high esteem and gratitude for his untiring efforts to advance their interests, especially during the three years he occupied the Presidential Chair, 1876, 1877, 1878."

(*Author's Note.*—This should, in fact, be 1875-1879.)

The Royal College has had other full-length portraits, but with the demand for wall space the Council, in the past, has had to effect certain amputations. Thus Thomas Greaves, President, 1869-70, swarthy and with great growth of whiskers, hair and eyebrows, smiles from over the Committee Room mantelpiece, reduced to a head and shoulders portrait. Yet, in this case, one cannot but feel that the removal of many square feet of dim background and black coat has served to emphasise a delightful personality by concentration on the face alone. So, too, the amputation below the knees of George Fleming, C.B., LL.D., and the tilt of his portrait from the wall high over the door to the Common Rooms, gives the impression of his present readiness again to force the 1881 Act through Parliament. With poised quill pen, he looks across to his predecessor as President—Sir Frederick Fitzwygram, the latter with a long mournful moustache and a tight grip on a veterinary journal.

Whether their respective place in veterinary history is fairly assessed by the treatment of their portraits is not the point at issue. It is, however, significant that earlier Councils, when faced with the choice of sacrifice, retained the entirety of Sir Frederick. In any event there is no doubt that during the student lives of every member of the Royal College the name Fitzwygram* was the best known because of his prizes. These, first given in his lifetime and continued by bequest in his will, have represented, since 1875, the highest honour obtainable in the qualifying examinations. The old regulations stated :—

> "Only students of the Royal College of Veterinary Surgeons who, during the year expiring on the 1st day of August, shall have passed the Final Examination for the Membership Diploma of the Royal College of Veterinary Surgeons shall be eligible for the prizes to be awarded for that year, and no student who shall have failed in any of the examinations of the said College during his curriculum shall be eligible for a prize."

The prize next in importance is the Williams Memorial Prize, founded in memory of William Williams, Principal of the New College, Edinburgh, and President of the Royal College, 1879-80. Since 1908 it has been awarded to the student passing the best final Membership Diploma examination in each year.

The fine rugged portrait of Principal Williams looks down at the President's chair in the Council Chamber of the Royal College, whence two announcements of great significance in British veterinary history have recently been made. Each concerned the Veterinary School of the University of Liverpool, directly descended from his own New College, moved from Edinburgh to Liverpool, in 1904. The one was the first order under Section 1 of the 1948 Act making a University Veterinary Degree registrable, and the other, the establishment of the first Veterinary Faculty in Great Britain. Strangely enough, the first of these announcements was one of the reasons which caused the Royal College Council to suspend the award of his prize as well as the Fitzwygram and Walley Memorial Prizes, the other reason being that some veterinary schools, pending the transfer of veterinary education and examinations to the Universities, had not adopted the new or revised syllabus for the M.R.C.V.S. Diploma, introduced by the Royal College in October, 1945. It is important to appreciate that a new scheme for awarding the prizes would have had to be introduced, even if the "one portal" system had continued.

The Walley Memorial Prize could no longer be awarded after 1948. Founded in memory of Thomas Walley, sometime Principal of the Royal (Dick) Veterinary College, and President of the Royal College, 1884-85, it had, since 1900, been awarded to the student obtaining in the previous two years the highest number of marks in the written questions in Parts II and III of the third examination and Part I of the fourth examination. Walley alone, of the three great Diploma prize names, has no adequate portrait in the Royal College. The present Registrar has found a faded photograph which he has framed and hung up in the College Committee Room.

There was one further M.R.C.V.S. Diploma prize which had never been awarded ; there being insufficient funds to provide an adequate yearly income. This was the A. W. Lawson of Falkirk Silver Medal for the student who secured the highest aggregate of marks in the subjects of Physiology, Pathology and Veterinary Medicine without having failed in any previous examination.

The problem before the Council of the Royal College was how best to give effect to the intention of the foundation trusts ; bearing in mind that, besides the difficulty of two syllabi for the M.R.C.V.S. Diploma, in the near future the Universities would examine their own veterinary students. Consideration was given to many schemes ; the basic object was to find some test which would place the undergraduates in each University veterinary school on the same competitive level. The chosen scheme, set out below, not only received the necessary approval of the Minister of Education, but also of Miss Fitzwygram, and Major Guy Paget (recently and tragically killed whilst hunting), Sir Frederick's surviving child, and his surviving trustee respectively.

It will be noticed that the Council's new scheme has the advantage that those who obtained their M.R.C.V.S. Diploma or registrable University Veterinary Degree in 1950 and 1951 will still have the opportunity to win a historic prize for the year of their graduation although it was in abeyance in the year when they graduated. Whatever their present occupation, it is to be hoped that the spur of sharing in the historic past will impel them to compete for the first of the prizes to be awarded in the historic present.

W. G. R. O.

* It is interesting to consider that had Sir Frederick's father not changed his name to Fitzwygram, the prize would have had the old family name of Wigram, which is that of the present Baronet.

Subscriptions.—On an enquiry, it was agreed that the subscriptions of practitioners were personal to the individuals and did not attach to the practice as such.

Finance.—The financial position of both the Defence and the Benevolent Funds was considered and further investments were made on behalf of the Defence Fund from surplus liquid resources.

FITZWYGRAM, WILLIAMS, WALLEY AND LAWSON PRIZES

for

1950, 1951 and 1952

The Minister of Education has approved of a scheme to govern the award of the above prizes: the Council of the Royal College of Veterinary Surgeons being unable to continue the conditions originally laid down by the founders.

The following conditions shall have effect for the future:—

(*a*) The Council of the R.C.V.S. shall set up a Prize Board of three members to award the Fitzwygram, Williams, Walley and Lawson Prizes under the scheme set out below; such Board to act as examiners and to have the power to co-opt other persons as examiners;

(*b*) The Prize Board shall announce on or about April 1st in each year a subject for a prize essay to be selected from the subjects to be studied for the examinations for the diploma of M.R.C.V.S., or the registrable veterinary degree of a university;

(*c*) No person shall be permitted to submit an essay unless:—

(i) he had not failed or been referred in any examination leading to the diploma or veterinary degree;

(ii) he was a student of a veterinary school affiliated by Royal Sign Manual, or in respect of which an Order had been made under Sections 1 or 3 of the Veterinary Surgeons Act, 1948;

(iii) he had obtained the diploma or degree in the year in respect of which the prize was awarded;

(*d*) All essays in respect of the subject announced on April 1st of each year shall be submitted to the R.C.V.S. not later than December 31st in that year;

(*e*) The essay which shall be adjudged by the Prize Board to be the best shall be awarded the Fitzwygram Prize for the year to the value of 30 gns. in cash, together with a prize certificate;

(*f*) The essay which shall be adjudged by the Prize Board to be the second best shall be awarded the Williams, Walley and Lawson Prize for the year to the value of 20 gns. in cash, together with a prize certificate;

(*g*) In the event of a tie for any of the above prizes then the prize shall be divided amongst the persons who stand equally;

(*h*) In the event of the Prize Board being of the opinion that no essay had reached the required standard then the prizes need not be awarded;

(*i*) The essay shall be:—

(i) Typewritten, with double line spacing on one side of each page only;

(ii) Of not more than 10,000 (ten thousand) words;

(iii) Anonymous; bearing no particulars of identity, but only a number to be obtained from the Registrar of the Royal College of Veterinary Surgeons prior to sending the essay to him.

Awards for 1950, 1951 and 1952

As no awards were possible in the years 1950 and 1951, the Council of the Royal College of Veterinary Surgeons will give each graduate who obtained a registrable University degree or the M.R.C.V.S. diploma, other than under by-law 95, in each of these two years (subject to the general conditions above being fulfilled), the opportunity to compete for prizes to be awarded retrospectively in respect of each year. The successful candidates will be known as Fitzwygram Prizemen, or the Williams, Walley and Lawson Prizemen, 1950 or 1951, according to the year of graduation. These prizes are additional to the first normal prizes for the year 1952, for which only persons graduating in this year by means of an M.R.C.V.S. diploma (other than under by-law 95) or a registrable degree are eligible subject to the general conditions set out above.

Essay Subjects

1950 Graduates: "Animal Husbandry: its relation to animal health and food production."

1951 Graduates: "Infectious diseases of cattle, sheep, pigs and poultry; their control."

1952 Graduates: "Breeding methods: their relation to improvement in food production from farm animals including poultry."

Closing Date

All essays for the 1950, 1951 and 1952 prizes must be in the hands of the Registrar of the Royal College of Veterinary Surgeons not later than December 31st, 1952

WARNING

Jury Service

We have been requested to give prominence to the following intimation:—

Any person on the Register of veterinary surgeons or the Supplementary Veterinary Register will be liable for jury service, unless he or she takes the necessary steps to observe the law. Exemption is not given automatically by the Veterinary Surgeons Act, 1948. It is necessary for the person concerned to make certain each year that the jury mark has not been placed against his or her name in the electoral register. The Registrar, the Royal College of Veterinary Surgeons, is constantly being consulted by members who have been summoned for jury service and who have not taken the trouble to secure their exemption. The warning has been given to the profession in every manner possible, and once a summons for jury service has been served the only way to avoid service is by getting the Under Sheriff concerned to exercise his discretion and release the person concerned. However, he is under no obligation to do so.

Advice

1. *If you have not taken the necessary action, write immediately to the local authority responsible for compilation of the electoral roll on which your name stands. State that you are a practising veterinary surgeon and that by section 24 of the Veterinary Surgeons Act, 1948, you are entitled to have the jury mark removed from your name in the electoral list. Ask for confirmation that this has been done and if possible that it will not be placed against your name in future until further notice.*

2. *If you have neglected to take this reasonable precaution and you are summoned for jury service, write to the Registrar, R.C.V.S., giving full particulars of the Under Sheriff concerned and his address and the date, time, and place for which you have been summoned. The Registrar will do then what he can on your behalf. If he fails then you may be away from your practice for an indefinite number of days.*

QUESTIONS IN PARLIAMENT

Foot-and-Mouth Disease

Mr. Iain MacLeod (May 12th) asked the Minister of Agriculture how much has been spent on research into foot-and-mouth disease in each of the last three years; how many research stations specialise in this work; and what is the staff employed at each.

Sir T. Dugdale: Research into foot and mouth disease is carried out at the Foot-and-Mouth Disease Research Institute at Pirbright, Surrey. The annual expenditure has been as follows:—

	£
1949-50	62,000
1950-51	53,000
1951-52	78,000

The scientific staff, including the Director, at present numbers 20.

. . . . . .

Mr. Grimond (May 13th) asked the Minister of Agriculture what steps he is taking to minimise the loss and dislocation caused to the country and farmers by the standstill orders due to foot-and-mouth disease; and, in particular, how far he is encouraging a greater amount of local slaughtering.

Mr. Nugent: My right hon. Friend is doing everything possible to bring the outbreaks under control. In addition, the infected areas are demarcated as far as possible to include slaughterhouses. I understand from my right hon. and gallant Friend the Minister of Food that full use is being made of the slaughtering facilities in the infected areas and that the only limiting factor is the capacity of the slaughtermen, who are working at high pressure.

XUM

Mr. Robert Crouch (May 15th) asked the Minister of Agriculture if he will allocate an extra £1,000,000 this year for research on foot-and-mouth disease.

Sir T. Dugdale: No, Sir. The Ministry's Estimates for 1952-53 have already been presented to the House, and I am satisfied that this research is already proceeding as intensively as is practicable, bearing in mind the developments already in hand.

Mr. Crouch: In view of the concern at the present outbreak of foot-and-mouth disease and the loss of livestock, does not my right hon. and gallant Friend think that the time has arrived when research should be made into the cause of the disease and the conditions responsible for incubating these germs, rather than research into vaccines for its prevention?

Sir T. Dugdale: All aspects of this disease are being looked into in the future.

Mr. Harold Davies: Will the right hon. Gentleman, if he is not prepared to spend more money, at least consider the suggestion I made to him last week, that he should look into the methods of European suppression of foot-and-mouth disease and call a European conference?

Sir T. Dugdale: Every aspect of this matter will be examined. As I explained last week, a maintenance grant of £94,000 was made for this financial year, and we consider that adequate for the existing necessity.

Colonel Stoddart-Scott asked the Minister of Agriculture if he is aware of the tri-valent vaccine used effectively in the Argentine for foot-and-mouth disease; and what results were obtained from the experiments done at the Pirbright research station with the 10 gallons of serum given by the Argentine Government in 1943.

Sir T. Dugdale: Research at Pirbright on vaccination against foot-and-mouth disease includes the use of tri-valent vaccines such as that used in the Argentine. With regard to the second part of the Question, numerous unsolicited gifts of serum are received by the Institute. I understand that the hyper immune serum to which my hon. and gallant Friend refers came from a commercial firm. The nature and properties of hyper immune serum are well known to the Institute.

Mr. Hollis asked the Minister of Agriculture whether, as part of the campaign against foot-and-mouth disease, he will encourage the construction at every farm of a shallow concrete dip, to be filled with a solution of strong disinfectant, through which the cattle can be daily driven.

Sir T. Dugdale: I am advised that my hon. Friend's suggestion would not be effective in preventing outbreaks since, under natural conditions, cattle do not contract foot-and-mouth disease through the feet, but through the mucous membranes.

. . . . .

Sir I. Fraser (May 14th) asked the Minister of Agriculture what effect it is estimated that the latest outbreak of foot-and-mouth disease will have upon meat and milk supplies.

Mr. Nugent: My right hon. and gallant Friend estimates that the amount of meat lost in the past six months by the slaughter of animals is of the order of 2,000 tons or approximately 0.5 per cent. of home output during that period. He cannot give a quantitative estimate of the effect on milk supplies, but it will be slight.

Mr. Hugh Fraser (May 14th) asked the Minister of Agriculture whether, in view of the special virulence of foot-and-mouth disease in certain areas, including North Staffordshire, he will temporarily reopen more slaughterhouses to avoid the total loss to the meat ration of many condemned though uninfected animals.

Mr. Nugent: All animals slaughtered on account of foot-and-mouth disease are slaughtered on the infected premises and my right hon. and gallant Friend could not agree to any animals being moved from such premises to slaughterhouses. Whenever possible, the carcases of animals slaughtered on the farm and not infected are salvaged for human consumption.

. . . . .

Veterinary Therapeutic Substances (Sera and Vaccines) (Standards)

Mr. E. Johnson (May 15th) asked the Minister of Agriculture when his Department will be able to undertake the inspection and control of the manufacture of sera and vaccines used for veterinary purposes, in accordance with an undertaking given on behalf of his Department more than three years ago to representatives of the Universities Federation for Animal Welfare, the British Veterinary Association and the Pharmaceutical Society.

Sir T. Dugdale: A draft Order providing for the control of the manufacture of veterinary therapeutic substances and prescribing standards and tests of purity is under final revision with a view to its issue at an early date.

NOTES AND NEWS

Diary of Events

May 24th.—R.V.C. Athletic Club Sports Day, Goring Recreation Ground, 2 p.m.

May 27th.—Annual General Meeting of the National Veterinary Benevolent and Mutual Defence Society, at Manchester (The Midland Hotel), 2.30 p.m.

June 4th.—109th Annual General Meeting of the Royal College of Veterinary Surgeons, at 10, Red Lion Square, London, W.C.1, 12 noon.

June 4th.—Meetings of Editorial Committee, B.V.A.: Executive 2 p.m.; Main 3.30 p.m. (N.B.—These meetings have been brought forward from the second to the first Wednesday in the month.)

June 4th.—Annual General Meeting of the Victoria Veterinary Benevolent Fund, at 10, Red Lion Square, London, W.C.1,—immediately following the above.

June 4th.—Annual General Meeting of the Southern Counties Division, B.V.A., at Bournemouth (Grand Hotel), 6 p.m.

June 4th to 6th.—Meetings of Committees and Council, R.C.V.S., at 10, Red Lion Square, London, W.C.1.

June 5th.—V.V.B.F. Ladies' Guild Committee Meeting, at No. 9, Red Lion Square, London, W.C.1, 2.30 p.m.

June 11th.—Meeting of the R.A.V.C. Division of the B.V.A., at the R.A.V.C. Laboratory, Thornhill, Aldershot, 3 p.m.

June 12th.—Annual Meeting of the R.A.V.C. Golfing Society, at the North Hants G.C., Fleet.

June 13th.—R.A.V.C. Officers' Club Annual Dinner, at Grosvenor House, London.

Sept. 8th—13th.—Seventieth Annual General Meeting and Congress of the British Veterinary Association, at Harrogate.

R.C.V.S. Examinations

June 5th/6th.—D.V.S.M. Written Examinations at Edinburgh.
June 26th/27th.—R.C.V.S. Membership Written Examinations.

* * * * *

University of Nottingham Equates M.R.C.V.S. Diploma and Bachelor's Degree

The Senate of the University of Nottingham recently passed a resolution which is of considerable significance with regard to the taking of higher degrees in that University by graduates of our Royal College. The resolution approved the recommendation of the Higher Degrees Committee that recognition be given to the diploma of membership of the Royal College of Veterinary Surgeons as being equivalent to a Bachelor's degree.

* * * * *

PERSONAL

Dr. W. R. Wooldridge's Election to the Senate of the University of London

It is with pleasure that we note that Dr. W. R. Wooldridge, M.Sc., M.R.C.V.S., F.R.I.C., Scientific Director of the Animal Health Trust, has been elected by the past graduates of the Faculty of Science of the University of London to represent them on the Senate of the University.

Dr. Wooldridge has played an active part in university affairs for many years, in that he has been a Governor of Birkbeck College since 1934, when he was first elected to represent the past students who had graduated from that College. Later he became Chairman of the Finance and General Purposes Committee and Vice-Chairman of the Governors, which position he still holds. Dr. Wooldridge is one of the representatives of the British Veterinary Association on the Court of Governors of the Royal Veterinary College (now, of course, a School of the University) and is also a member of the Executive Council. In 1943 he was nominated by the Senate to represent the University of London on the Board of Governors of the South-Eastern Agricultural College, Wye, Kent, which at that time became an integral part of the University.

For the past three years Dr. Wooldridge has been a member of the Standing Committee of Convocation (past Graduates' Association) of the University of London, as well as participating in the work of various other committees.

Scottish Metropolitan Division Dinner to Mr. J. N. Ritchie

On the evening of May 2nd the Scottish Metropolitan Division arranged a dinner in the North British Station Hotel, Edinburgh, in honour of Mr. J. N. Ritchie to celebrate his recent appointment as Chief Veterinary Officer of the Ministry of Agriculture and Fisheries. A representative gathering of about 50 members attended under the chairmanship of the President, Mr. J. E. Wilson, who proposed Mr. Ritchie's health. In a speech enlivened by several anecdotes he traced Mr. Ritchie's career from his entry to the Royal (Dick) Veterinary College to the present, and assured him of the satisfaction his appointment had given to his colleagues in the Metropolitan Division and of the great pleasure it gave them to entertain him at this dinner. He offered him the congratulations of the Division and wished him a long, happy and successful tenure of office.

Thereafter the company was entertained by songs from Messrs. K. P. Anderson, N. Keith, S. Jennings and Dr. D. O. Morgan. Drs. Mitchell, Robertson, Greig and Blount and Captain Bisset added their quota of congratulations and reminiscences. A pleasant and memorable evening was concluded by the singing of Auld Lang Syne.

. . . . .

After an interval of 26 years—Dr. J. T. Edwards having been the guest speaker in 1926—the Royal Society of Tropical Medicine and Hygiene was addressed by a veterinarian at its meeting on May 15th. The speaker was Dr. James Carmichael, C.M.G., M.R.C.V.S., who took as his subject "Animal-man relationship in tropical diseases in Africa."

. . . . .

Birth.—Fishwick.—On May 11th, 1952, at Tunbridge Wells, to Cynthia, wife of Roy Fishwick, M.R.C.V.S., a son—Peter Roy.

. . . . .

Marriage.—Wilson—Ellis.—On May 3rd, 1952, at Holy Trinity, Malvern, Worcs, Peter Wilson, M.R.C.V.S., to Elizabeth Mary Ellis.

. . . . .

Forthcoming Marriage.—Buie—Riggs.—The engagement is announced between Andrew, younger son of the late Mr. James Buie and of Mrs. Buie, Longmuir, Cornhill, Banffshire, and Muriel Cameron, youngest daughter of the late Mr. James Riggs and of Mrs. Riggs, Fettes, Killearnan, Ross-shire.

* * * * *

R.C.V.S. OBITUARY

Mackintosh, James, M.C., Ash Villa, Wick, Divisional Veterinary Officer, Animal Health Division, Ministry of Agriculture and Fisheries. Graduated Edinburgh, December 18th, 1923. Died May 13th, 1952; aged 54 years.

Rankin, James Deans, Fu'wood, Lanceshaw Bridge, Colne, Lancs. Graduated London, September 18th, 1897. Died May 11th, 1952; aged 75 years.

. . . . .

Mr. James Mackintosh, M.C., M.R.C.V.S.

We regret to record above the death, which occurred on May 13th, at Inverness, of Mr. James Mackintosh, who was Ministry of Agriculture Divisional Veterinary Officer for Caithness and Sutherland. A native of Embo, Sutherland, Mr. Mackintosh had been in the service of the Ministry of Agriculture and Fisheries for more than 30 years. He went to Wick in 1938. Mr. Mackintosh served with the Seaforth Highlanders in the First World War, attaining the rank of Captain and winning the M.C. In the Second World War he was an officer in the Caithness Battalion of the Home Guard.

* * * * *

FOOT-AND-MOUTH DISEASE

Removal of General Control Over the Movement of Livestock

On Thursday of last week the Ministry of Agriculture issued the following announcement:—

"From May 7th the movement and marketing of stock throughout the whole of England and Wales and that part of Scotland south and east of the Caledonian Canal has been controlled by an Order applying the provisions of the Foot-and-Mouth Disease (Controlled Areas Restrictions) General Order of 1938. The Order was made to restrict the movements of stock until the veterinary staff of the Ministry of Agriculture had traced all the animals which might have been exposed to infection in certain markets.

"The movements of these cattle have now been traced and although outbreaks are still occurring in Infected Areas there is now no reason to fear that the disease has been widely spread through markets. Some of the more recent outbreaks in Scotland, however, have presented certain unusual features calling for an extended period of observation.

"It is now possible to remove the Controlled Area restrictions over the whole of England and Wales and an Order has been made for this purpose having effect from midnight on Friday, May 16th. The restrictions imposed in the Infected Areas around the actual outbreaks will, of course, remain in operation. Because of the special features of the Scottish outbreaks, however, it is necessary to retain the Controlled Area restrictions in Scotland for a further period. If no unforeseen circumstances arise, it is hoped to remove the restrictions in Scotland at midnight on Wednesday, May 21st."

On that day announcement was made of the removal of the restrictions in Scotland.

There has been a great reduction in the daily number of confirmed new outbreaks since our last issue, these being from five to eight a day. On Tuesday outbreaks were confirmed in the Isle of Wight, in Cheshire and in Cumberland. The total number of outbreaks confirmed in England, Scotland and Wales since November 14th last was 317, the slaughter figures being 18,861 cattle, 12,415 sheep, 7,279 pigs and 20 goats.

On Tuesday evening, in "The World To-day" series of talks following the 9 o'clock news in the Home Service programme, Sir Thomas Dalling, Chief Veterinary Consultant, U.N. Food and Agriculture Organisation, broadcast on foot-and-mouth disease. In the course of his observations on research and policy Sir Thomas lucidly explained the reasons for the retention of the slaughter method and dealt with the other facts which formed the basis of the editorial appearing in our issue of May 10th.

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Ayrshire.—North Auchenbrain, Mauchline; Blackshaw Farm, West Kilbride (May 12th); Barskimmings Mains, Mauchline (May 15th).

Devonshire.—Lane End Farm, Culmstock (May 10th).

Edinburgh (City).—Royal Dick School of Veterinary Studies, Summerhall Square, Edinburgh, 9 (May 15th).

Dorsetshire.—Ashley Barn, Briantspuddle, Dorchester (May 10th).

Kent.—29, Fox Lane, Keston (May 14th).

Lincs (Kesteven).—The Buildings, Marston, Grantham (May 13th).

Norfolk.—Heath Farm, Filby, Gt. Yarmouth (May 13th).

Pembrokeshire.—Pontyderi Farm, Boncath (May 13th).

Somersetshire.—New Farm, Faulkland, Bath; Moat Farm, Compton Martin, Bristol (May 10th); Lower Tadhill Farm, Leigh-on-Mendip, Bath (May 12th); Warren Farm, Masbury, Shepton Mallet (May 13th); Chewton Fields Farm, Chewton Mendip (May 15th).

Staffs.—Lime Crofts Farm, Crakemarch Uttoxeter (May 10th).

Suffolk (E.).—Hall Farm, Worlingworth, Woodbridge (May 10th).

Warwicks.—St. Giles Farm, Spernal, Studley (May 9th).

Wilts.—Blackmore Farm, Melksham (May 13th).

Foot-and-Mouth Disease:

Argyllshire.—New Croft, Fionnphort, Isle of Mull (May 15th).

Berks.—Manor Farm, West Hanney, Wantage (May 13th).

Cheshire.—Oat Eddish Farm, Walgherton, and Council Holding, Hurleston, Nantwich (May 14th).

Derbyshire.—Lower Vicarwood Farm, Mackworth (May 12th).

Salop.—The Wems Farm, Adderley, Market Drayton (May 12th); Hawkesmoor, Adderley, Market Drayton (May 13th); Sidway Mill, Market Drayton (May 15th).

Staffs.—Broadbay Farm, Cheadle (May 12th); Moddershall Grange, Stone (May 15th).

Stirlingshire.—Bridgehaugh Field, Stirling (May 12th).

Sussex (E.).—Pevensey Marsh Grazing, Pevensey (May 13th).

Warwicks.—Chapel Farm, Barby, Rugby (May 15th).

XUM

FOWL PEST:

Kent.—Dunn Street, Bredhurst, Chatham (May 9th).
Norfolk.—Mill Road Farm, North Tuddenham, Dereham (May 12th).
Suffolk (W.).—Loft Farm, Cockfield, Bury St. Edmunds (May 9th); School Farm, Ousden, Newmarket (May 13th).

SWINE FEVER:

Bucks.—Round Hill Estate, Kimble (May 14th).
Cambridge.—Newnham House, Commercial End, Swaffham Bulbeck (May 12th).
Derbyshire.—Bee Farm, Clay Lane, Clay Cross (May 14th).
Durham.—Cemetery Road Piggeries, Southwick, Sunderland (May 12th).
Essex.—Bird-in-Hand Allotments, Chapel Hill, Halstead (May 12th).
Glouc.s.—Gags Row, Newnham Bottom; Wigpool, Grybrook, Mitcheldean (May 14th); 13, Tramway Road, Ruskidge, Cinderford (May 15th).
Hunts.—Station Mills, Kimbolton (May 12th).
Kent.—Sandy Lane Meadows Piggeries, Willesborough Lees (May 12th).
Lancs.—Hopwood Hall Farm, Heywood (May 12th); Got Green Farm, Junction Road, Deane, Bolton (May 15th).
Leics.—Hall Farm, Sutton Cheney (May 13th).
Lincs (Holland).—Howell Road, Heckington (May 12th).
Lincs (Kesteven).—Green Lane, Swinderby (May 12th).
Middx.—R.N.O. Hospital, Brockley Hill, Stanmore (May 15th).
Northants.—Banbury Road, King's Sutton, Banbury (May 14th); Richmond Street, King's Sutton, Banbury (May 15th).
Notts.—Gatehouse Gardens, Linby, Nottingham (May 12th).
Salop.—Gosford Grange, Shifnal (May 13th).
Staffs.—169, Caledonia Road, Wolverhampton (May 14th).
Suffolk (W.).—Freecroft Farm, Hessett, Bury St. Edmunds (May 16th).
Surrey.—Christmas Farm, Piggets Lane, Salford (May 12th); Redeham Hall Farm, Keeper's Corner, Burstow, Nr. Horley (May 17th).
Warwicks.—Stoneymoor Wood, Burton Green, Kenilworth (May 12th); 17, Bridge Street, Polesworth (May 13th); Girvan Poultry Farm, Kenilworth Road, Cubbington, Leamington Spa (May 15th); 20, Clifford Chambers, Stratford-on-Avon (May 16th).
Yorks (N.R.).—High Green, Great Ayton, Middlesbrough (May 14th); Worsall Manor, Low Worsall, Yarm-on-Tees (May 16th).

* * * * *

LEGAL NOTES

"MEAT" HELD NOT TO INCLUDE FISH

On Thursday of last week, in the Divisional Court (the Lord Chief Justice, Mr. Justice Jones and Mr. Justice Parker) the Court had before them the question whether fish were included in the definition of "meat" which appears in section 125 of the Transport Act, 1947. The section provides that "meat" means carcases of animals, parts of carcases of animals, or offals of animals suitable for human consumption.

The Lord Chief Justice said that in view of their decision on another point raised in the case it was not strictly necessary to give a decision on that point, but they had been asked to express an opinion on it. In the times of Dr. Johnson and earlier it was a common thing to speak of "meat" as meaning food. In Stuart times and probably in Dr. Johnson's he did not think that vegetables would have been excluded from being meat. Nowadays "meat" had ceased to be used as meaning food. When people in the ordinary course of conversation or in writing referred to meat they generally meant butcher's meat. It might also include hares, rabbits, and possibly poultry, and game. Those points might have to be decided some day.

Livestock was also included in the section with which they were concerned. When the animals on a farm were sold, under the heading "livestock," it would probably include live poultry, but it did not necessarily follow that dead poultry would be included as meat.

He was giving no decision on that point but what he did decide was that "meat" in the Transport Act, 1947, did not include fish. He was fortified to some extent in this view by two considerations. If the Act meant to include fish as meat it would have been extremely easy to say so, and it could not include vegetables because the section referred to carcases of animals. In modern days scientists were inclined to regard anything that breathed or moved as an animal, but he did not think that anyone would speak of a fish lying on a fishmonger's slab as the carcase of a fish.

It was not necessary to deal with the question whether the flesh of a whale was meat; though it might have to be decided some day. It was enough to say that he was not prepared to hold that, for the purposes of the Transport Act, meat included fish.

* * * * *

The African elephant in the Kruger National Park of South Africa is inquisitive and intelligent. Rangers have found that elephants unscrew the outlet pipes of the windmills which were recently erected. The piping which they unscrew easily with their trunks would require the use of a heavy monkey-wrench in the hands of a man. The outlet pipes are now being camouflaged.—*The Times.*

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

VETERINARY PRACTITIONERS

Sir,—Mr. Waller (May 10th, 1952) refers to the professional status granted to persons on the S.V.R. by the Veterinary Surgeons Act, 1948. That Act did not grant persons on the S.V.R. equivalent professional status to members of the Royal College.

The introduction to the Act stated that it was to restrict the practice of veterinary surgery by unqualified persons. It then provided for a list (the S.V.R.) to be made of those persons whose practice it was in the nation's interest to restrict. The S.V.R. was to enable the public to differentiate between qualified and unqualified persons (I use the terms of the Bill) and to enable disciplinary control to be exercised over the persons on that Register.

The requirements for entry on the S.V.R. are age, character and proof that the applicant has been diagnosing and treating animals as his principal means of livelihood. There is no reference to knowledge, skill or ability.—Yours faithfully, G. W. SERTH, 102, Brighton Road, Purley, Surrey. *May 12th*, 1952.

* * *

Sir,—In answer to the points raised in Mr. Ivor Hughes' letter in the *Record*, he and other fellow practitioner members of the B.V.A. may be interested to know that there has just been formed a Veterinary Practitioners' Division of the B.V.A., of which I am the Hon. Secretary. If any of these members care to write to me I shall be only too glad to forward them a copy of our rules and by-laws and any other relevant information.—Yours faithfully, J. W. WALLER, 342, South Lambeth Road, London, S.W.8. *May 16th*, 1952.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange	Sheep Scab	Swine Fever
16th to 30th April, 1952	39	43	8	—	—	49
Corresponding period in—						
1951	26	—	6	—	—	32
1950	17	—	9	—	—	1
1949	16	—	22	—	1	1
1st Jan. to 30th April, 1952	174	115	100	—	1	398
Corresponding period in—						
1951	194	17	457	—	4	280
1950	155	12	69	—	19	2
1949	64	11	162	—	27	5

Tuberculosis (Attested Herds) Scheme

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at April 30th, 1952, was as follows:—

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
39,804	22,797	18,910	81,511